

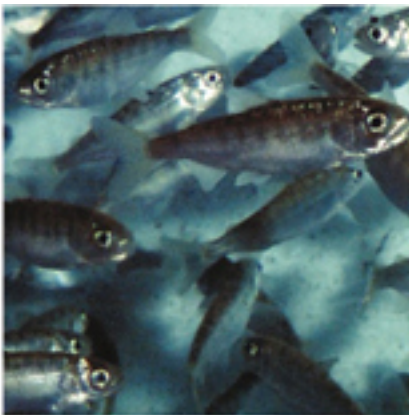
Habitat Evaluation Procedures (HEP) Report;

Big Island - The McKenzie River

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BIG ISLAND-THE MCKENZIE RIVER
Habitat Evaluation Procedures

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INTRODUCTION

The Big Island site is located in the McKenzie River flood plain, containing remnant habitats of what was once more common in this area. A diverse array of flora and fauna, representing significant wildlife habitats, is present on the site. Stands of undisturbed forested wetlands, along with riparian shrub habitats and numerous streams and ponds, support a diversity of wildlife species, including neotropical migratory songbirds, raptors, mammals, reptiles, and amphibians (including two State-listed Sensitive Critical species). The project is located in eastern Springfield, Oregon (Figure 1). The project area encompasses 187 acres under several ownerships in Section 27 of Township 17S, Range 2W.

Despite some invasion of non-native species, the site contains large areas of relatively undisturbed wildlife habitat. Over several site visits, a variety of wildlife and signs of wildlife were observed, including an active great blue heron rookery, red-legged frog egg masses, signs of beaver, and a bald eagle.

Wildlife habitat values resulting from the purchase of this site will contribute toward the goal of mitigating for habitat lost as outlined in the Bonneville Power Administration's (BPA) Mitigation and Enhancement Plan for the Willamette River Basin. Under this Plan, mitigation goals and objectives were developed as a result of the loss of wildlife habitat due to the construction of Federal hydroelectric facilities in the Willamette River Basin.

Results of the Habitat Evaluation Procedures (HEP) will be used to: 1) determine the current habitat status of the study area and habitat enhancement potential of the site consistent with wildlife mitigation goals and objectives; and 2) develop a management plan for the area.

HISTORICAL BACKGROUND

The island has historically been in private ownership, except for land bordering the south bank of the McKenzie River, which was in state ownership until the 1970's.

Some human disturbance has occurred, including logging and crop cultivation. Fields located in the southwest portion of the study area have been cultivated with a variety of crops including strawberries, raspberries, corn, alfalfa, wheat and pole beans dating back to 1920. Selective thinning of "high-grade" cottonwood has occurred at various times between the 1970's and the 1990's on both the west and east portions of the site.

SITE DESCRIPTION

The study area is located on the south bank of the McKenzie River at the north end of 66th Street, in Springfield, Oregon (Figure 1). The island is designated agricultural and is zoned for exclusive farm use. Thirty-five acres are zoned for sand and gravel. In the early 1990's a gravel extraction pit was proposed and preliminary excavations were made. However, this proposal was later abandoned.

Other natural resources studies conducted at this site include a Wildlife Habitat Inventory and Assessment conducted by an environmental planning consultant and a Goal 5 Inventory prepared by the Lane Council of Governments for Lane County (Newhouse, 1991 and L-COG, 1992, respectively).

The study area is a mosaic of deciduous forested wetland and riparian shrub plant communities interlaced with variable bodies of water comprised of old and current river channels, flood corridors, permanent ponds, and vernal pools. The southern portion of the area is comprised of old agricultural fields bordered by stream channels with narrow zones of riparian vegetation.

Non-native plants such as Himalayan blackberry (*Rubus discolor*), Scotch broom (*Cytisus scoparius*), and reed canarygrass (*Phalaris arundinacea*) have become established in areas of disturbance. Encroachment of Himalayan blackberry and reed canarygrass into closed canopy stands of forested wetland may be attributed to the change in hydrology on the site, allowing some areas to become drier over time due to managed water flow by upstream dams on the McKenzie River.

Wildlife surveys on Big Island (Spring 1999) provided the following information: 22 great blue heron nests, 84 red-legged frog egg masses and 76 northwestern salamander egg masses (see Appendix A). Local residents have observed western pond turtles, a state-listed Sensitive Critical Species. A great blue heron rookery located on the west end of the island has been monitored by ODFW since 1989.

The wildlife habitat value at this site is based on the high structural diversity of the vegetation providing food, roosting, perching, nesting and cover opportunities for many species of wildlife, diversity in water bodies, wetlands and forests, and proximity to the McKenzie River.

Habitat Types

Six habitat types (also referred to as cover types in the chosen Habitat Suitability Index (HSI) models and loss assessments) were delineated in order to assess wildlife habitat values for the study area. Habitat types and descriptions were based on:

- 1) Vegetation cover types as described in the Loss Assessment at Cougar Dam & Reservoir Project, South Fork McKenzie River, Oregon;
- 2) Cover requirements as described in the models;
- 3) Vegetation communities;
- 4) Field verification of vegetation communities.

Vegetation cover types adhere to the nomenclature as described in the "Wildlife and Wildlife Habitat Loss Assessment at Cougar Dam & Reservoir Project, South Fork McKenzie River, Oregon" (Noyes et al. 1985). Species encountered on-site have been included for reference.

Riparian shrub

Riparian shrub was found in small acreages scattered throughout the interior of the study area and along the McKenzie River main corridor. The predominant species found were pacific willow (*Salix lucida* Muhl. ssp. *lasiandra*) and scoulers willow (*Salix scouleriana*). Reed canarygrass and Himalayan blackberry was extensively invasive, greatly decreasing species diversity in all areas surveyed. Stands of mature scotch broom, some in excess of 20 feet tall, were found adjacent to several riparian shrub communities. An aggressive removal of non-native plant species would increase the value of the native plant communities greatly.

Willow species are the dominant riparian shrubs in the Big Island study area. The under-story is composed primarily of reed canarygrass, with scouring-rush (*Equisetum hyemale*) present in some areas.

Riparian hardwood

This habitat type composes almost half of the total acreage of the study area forming a contiguous stand of mature deciduous forest. Bigleaf maple (*Acer macrophyllum*) and black cottonwood (*Populus trichocarpa*) are the dominant overstory trees. Red alder (*Alnus rubra*), incense cedar (*Calocedrus decurrens*), and douglas fir (*Pseudotsuga menziesii*) are present as secondary canopy species. Species composition of the understory vegetation varied locally throughout the study area. Vine maple (*Acer*

circinatum), Indian plum (*Oemlaria cerasiformis*, and snowberry (*Symphoricarpos albus*) appeared to be the dominant shrub where they were found. Other understory species included red-osier dogwood (*Cornus stolonifera*), beaked hazelnut (*Corylus cornuta*), twinflower (*Linnea borealis*), stinging nettle (*Urtica dioica*), sword fern (*Polystichum munitum*) scouring rush (*Equisetum hyemale*), pacific waterleaf (*Hydrophyllum tenuipes*), and pacific bleeding heart (*Dicentra formosa*).

The loss assessments indicated that the riparian hardwoods occurred on alluvial stream terraces above the reservoir and along the river below the dam. These stands appeared to be seral stages of temperate conifer forest, although flooding and channel migration could maintain the species composition for extended periods.

Sand/gravel/cobble

The majority of this habitat type makes up a series of sandbars in and along the main corridor of the McKenzie River. Vegetation is sparse due to the ongoing scouring by river currents. Riparian shrub communities (ie. willow, reed canarygrass) have developed on some of the more stable substrates, sheltered from the high velocity currents of the river.

Disturbed/bare/rock

This coverage type included naturally barren areas as well as those where severe or continued disturbance prevented the re-establishment of vegetation. Human activities are the main culprit for the creation of this habitat and include: roads and areas of logging and gravel extraction. The majority of the disturbed acreage is contained within the eastern interior portion of the study area. In this section, a dense monoculture stand of invasive scotch broom (*Cytisus scoparius*) towers in excess of 20 feet tall and spans all directions. Himalayan blackberry (*Rubens discolor*) and reed canarygrass (*Phalaris arundinacea*) are the other dominant species present in the disturbed areas.

Agricultural, croplands

This habitat type is contained along the southern portions of the study area. Surrounded by stream channels, these old fields are bare of any trees except along their margins. Introduced grass species such as meadow foxtail (*Alopecurus pratensis*) dominate the area. Himalayan blackberry is sparse within the fields, but present as hedgerows along the perimeters. Other non-native species present include: reed canarygrass, perennial ryegrass, and fescue.

Open Water

Historical side channels of the McKenzie River and ponds are present throughout the site. Areas containing water at least six months of the year were defined as ponds as determined through site visits and review of aerial photographs dating from 1936 to 1998. In 1960 the river changed course from cutting across the southern portion of the study area to going around the island, to the north. The change in hydrologic conditions in the river system over the past 30 years has caused overall drier on-site conditions, which in turn effects habitats and allows the invasion of exotic species such as reed canary grass which can't tolerate the type of flooding that occurred with the historical hydrological regime.

EVALUATION PROCEDURES

Habitat evaluation procedures (HEP) developed by the U.S. Fish and Wildlife Service (USFWS 1980), utilizes a species/habitat approach for quantifying relative habitat values. Several wildlife species are selected for a particular area. Each species has various habitat needs that are documented in a Habitat Suitability Index (HSI) model. HSI models primarily focus on the measurement of physical and chemical habitat variables that are used to calculate an index to habitat quality. The model includes information on habitat use, model structure, assumptions, application, and references.

The habitat in a study area is compared to optimum habitat (defined in each HSI model) for a given species to result in a HSI. The HSI is a number between 0 and 1:

0 represents no habitat suitability

1 represents optimum habitat suitability

The HSI is multiplied by the number of acres of a particular habitat in the study area to obtain Habitat Units (HU's).

$$\text{HSI} \times \text{Acres} = \text{HU's}$$

1 Habitat Unit = 1 acre with optimum habitat
suitability

SPECIES SELECTION

The HEP team selected the following species to determine the relative value of wildlife habitat at the Big Island-McKenzie River Site:

1. Yellow Warbler (*Dendroica petechia*)
2. Black capped Chickadee (*Parus atricapillus*)
3. Downy Woodpecker (*Picoides pubescens*)
4. Pond Breeding Amphibians (this draft model focuses on the following species; Northwestern salamander (*Ambystoma gracile*), Long-toed salamander (*Ambystoma macrodactylum*), Rough-skinned newt (*Taricha granulosa*), Red-legged frog (*Rana aurora aurora*), Pacific treefrog (*Pseudacris regilla*), spotted frog (*Rana pretiosa*), and Western toad (*Bufo boreas*).
5. Beaver (*Castor canadensis*)
6. Spotted Sandpiper (*Actitis macularia*)

Criteria for species selection was based on 1) the priority goals developed in the Willamette River Basin Wildlife Mitigation Plan, 2) target species for the Willamette Basin Projects (see Table 1), 3) habitat use, 4) ecological role, and 5) species selected for HEP at ecologically similar sites.

Table 1 Target Species of the Willamette Basin Projects		
Big Game	Waterfowl	Upland Game
Black-tailed deer Roosevelt elk Black Bear Cougar	Harlequin duck Wood duck Common merganser Greater scaup	Ruffed grouse California quail Ring-necked pheasant Band-tailed pigeon W. gray squirrel
Fur-bearers	Non-game	
Beaver River otter Mink Red fox	Bald eagle Osprey Spotted owl Pileated woodpecker American dipper Yellow warbler	

The HEP team considered multiple models during the species selection process. Final species selection was based on season of use, and habitat use in relation to food, reproduction, and

cover requirements. The species selected represent guilds of species, including:

- cavity nesters (Downy Woodpecker, Black-capped Chickadee)
- riparian tree nesters (Black-capped Chickadee)
- shrub-scrub users (Beaver, Yellow Warbler)
- fur-bearers (Beaver)
- amphibians (Pond breeding amphibians)
- shorebirds (Spotted Sandpiper)

No species were chosen to represent waterfowl, since it was determined that these species needs were adequately covered in the beaver, pond-breeding amphibian, and spotted sandpiper models. Essentially the entire habitat in the study area was considered suitable for big game species such as deer and elk, and no models were chosen to represent this guild. Deer were observed at the site on several occasions when fieldwork was being conducted.

METHODOLOGY

In the summer of 1998, a team was formed to develop and implement quantitative Habitat Evaluation Procedures (HEP) to document the value of various habitats in the study area. HEP participants included Greg Sieglitz, Sue Beilke, Denis O'Brien, and Sandra Fife, of Oregon Department of Fish and Wildlife (ODFW). See Appendix A for model criteria.

Data Collection

The HEP team met several times in August, September and October 1998 to select target species, choose species models, determine sampling methodologies, and define habitat types. Data was collected between November and March to accurately measure present habitat conditions in the study area.

Data for the model variables was collected on November 5, 1998, December 15, 1998, January 13, February 3, and March 10 and 23, 1999. Habitat data was collected from 10 sampling sites (see Table 2). Most habitat measurements were made at 25 foot intervals, along a 125-foot transect. The Spotted Sandpiper model required a quadrat measuring 150 feet long and 40 feet wide. For some variables, such as basal area, the area measured included vegetation on either side of the transect line. Data was also collected at 2 temporary ponds and 2 permanent ponds to fulfill the Pond Breeding Amphibian Model requirements.

Transects were selected in different habitat types to represent different areas. If a habitat type varied significantly, more

samples were taken in order to get a representative view of what the present conditions were like.

Sampling techniques included clinometer, angle gauge, stadia rod, dbh tape, ocular estimation, and field team consensus to determine habitat variables. We took into account that ocular estimates of canopy coverage were made through seasonal changes and some ocular estimates were in the absence of foliage on deciduous species.

RESULTS AND DISCUSSION

Current habitat suitability indices (HSI) ranged from 0.5 for Pond-breeding amphibians in the pond habitat to 0.75 for the Black-capped Chickadee in the riparian hardwood habitat. HSI scores for several species (Black-capped Chickadee, Downy Woodpecker, and Beaver) were based on the model requirements of using the lowest of the two values for the reproduction and food (Black capped chickadee and Downy woodpecker) or food and water (Beaver) life requisites. For the Beaver and Pond Breeding Amphibians, different habitat types were analyzed and then combined to produce one HSI, rather than a separate HSI for each habitat type, based on requirements of the models.

TABLE 2 **BASELINE HABITAT CONDITIONS**

The McKenzie River Big Island Site Habitat Evaluation based on Suitability for Selected Wildlife Species. Results are expressed as Habitat Suitability Indices (HSI) converted to Habitat Units.

SPECIES	HABITAT TYPE	ACRES	HSI	HU
Beaver	Pond, Riparian hardwood, Riparian shrub	147.86	0.50	74
Yellow Warbler	Riparian shrub	52.75	0.70	37
Black-capped Chickadee	Riparian hardwood	88.04	0.75	66
Downy Woodpecker	Riparian hardwood	88.04	0.50	44
Pond breeding amphibians	Pond, Riparian hardwood	95.11	0.50	48
Spotted Sandpiper	Sand/Gravel/Cobble	15.75	0.65	<u>10</u>
Total				279

Based on the limiting factor concept, the HSI is equal to the lowest life requisite value obtained for either food or water for the Beaver model, and either food or reproduction for the Downy Woodpecker and Black-capped Chickadee models. Based on the model requirements, habitat types were combined to determine life requisite(s) and the HSI for the beaver.

Without enhancement activities, opportunities will be lost to increase habitat units for many of the selected species. In some areas, habitat quality would decline over time due to the continued encroachment of non-native plant species.

BEAVER

The HSI for the Beaver was based on a "limiting factor concept"; in this case the HSI was equal to the lowest life requisite value obtained for either food (1.0) or water (0.50). In the Beaver model, optimal conditions for the water component of the habitat (in all wetland cover types) require little or no fluctuation in water levels on an annual basis, in order to have a minimum impact on burrow or lodge entrances. Based on present conditions in the study area, and the model parameters, the final HSI was 0.5 for the riparian shrub, pond, and riparian hardwood habitats evaluated. However, due to the limitations of the model, it may not adequately reflect all of the actual conditions on the ground for the Beaver.

YELLOW WARBLER

Preferred habitats of the Yellow Warbler are wet areas with abundant shrubs or small trees, but also includes marshes and willow thickets. The HSI model considers the quality of the reproduction (nesting) habitat needs of the Yellow Warbler to determine overall habitat suitability. Food, cover, and water requirements are assumed to be met by nesting needs. In the riparian shrub cover type the HSI value of 0.7 reflects the slightly less than optimal habitat conditions in the study area.

BLACK-CAPPED CHICKADEE

The HSI values for the Black-capped Chickadee averaged 0.75 in the riparian hardwood habitat type. In one sample area the lack of suitable snags indicated a lack of nesting sites. However, in most other areas sampled, the HSI values for both food and reproduction equaled 1.0, reflecting the ability of this habitat type to meet both the food and reproductive needs of this species.

DOWNY WOODPECKER

The model for the Downy Woodpecker considers the ability of the habitat to meet the food and reproductive needs of this species. The HSI is equal to the lowest life requisite value for food or reproduction. The HSI value of 0.5 for reproductive needs and 0.6

for food suitability in the riparian hardwood habitat reflects a moderate ability of this habitat to meet the foraging and reproductive needs of the Downy Woodpecker.

SPOTTED SANDPIPER

The HSI of 0.65 indicates that the sand/ gravel/cobble habitat moderately meets the foraging and reproductive needs of this species in most areas surveyed. The nesting cover requirements (mosaic of herbaceous ground cover with an overall density of less than 50 percent and less than 2 ft high) were not met in some areas; either there was no herbaceous cover, or reed canary grass was present which exceeded the < 2 feet high requirement.

POND BREEDING AMPHIBIANS

The HSI value of 0.5 in the pond habitat indicates conditions in the aquatic environment are slightly less than optimal. A lack of native emergent vegetation as well as the encroachment of non-natives, particularly reed canary grass, contributes to the sub-optimal habitat. The habitat values for pond breeding amphibians could be raised with an increase in native wetland emergent vegetation, which provides egg attachment sites and cover for adults and tadpoles. High-quality upland habitat is present in the riparian hardwood for this species. This habitat is well dispersed throughout the site.

SUMMARY

At the present time, much of the Big Island-McKenzie River study area provides suitable habitat conditions for many wildlife species. Areas that are being invaded by non-native plant species, such as the disturbed areas and portions of the riparian shrub habitat, provide marginal or below marginal habitat for some of the species evaluated. Without enhancement activities, species such as Pond Breeding Amphibians will be negatively impacted due to a decline in the quality and quantity of habitat in some areas. Future management that includes eliminating non-native plant species and restoring native plant communities, would be beneficial by improving habitat conditions for the evaluation species and other wildlife that use the habitat in the study area.

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Appendix: HSI MODEL VARIABLES (V) FOR SELECTED HEP SPECIES

1. Beaver

- V1 = Percent tree canopy closure.
HSI equals 1.0 if between 40% to 60%.
- V2 = Percent of trees in the 1-6" dbh size class.
HSI between 0.2 and 1.0 if 0% to 100%.
- V3 = Percent shrub crown cover.
HSI equals 1.0 if between 40% to 60%.
- V4 = Average height of shrub canopy.
HSI equals 1.0 if > 6.6 ft.
- V5 = Species composition of woody vegetation (trees and/or shrubs). HSI equals 1.0 if woody vegetation is dominated (> 50%) by one or more of the following species: aspen, willow, cottonwood, or alder; 0.6 if woody vegetation dominated by other deciduous species. HSI equals 0.2 if woody vegetation is dominated by coniferous species (e.g. fir and pine).
- V6 = Percent of lacustrine surface dominated by yellow and/or white water lily.
HSI: 0.0 to 0.4 if 0% to 100%.
- V7 = Percent stream gradient.
HSI: 1.0 if < 6%.
- V8 = Average water fluctuation on an annual basis.
HSI: 1.0 if small fluctuations that have no effect on burrow or lodge entrances; 0.5 if moderate fluctuations that affect burrow or lodge entrances; 0.0 if extreme fluctuations or water absent during part of the year.
- V9 = Shoreline development factor.
HSI: 1.0 if > 3.0.

Riparian shrub (2 sample sites) riparian hardwood (1 sample site) and Pond (1 sample site) habitat types were evaluated. The HSI was equal to the lowest life requisite value obtained for either food or water, based on the limiting factor concept.

APPENDIX: (cont.)

2. Yellow Warbler

V1 = Percent deciduous shrub crown cover.

HSI: 1.0 if between 60% and 80%.

V2 = Average height of deciduous shrub canopy.

HSI: 1.0 if \geq 6.6 ft.

V3 = Percent of deciduous shrub canopy comprised of hydrophytic shrubs.

HSI: 0.1 to 1.0 if 0% to 100%.

The Riparian shrub (4 sample sites) habitat type was evaluated. The HSI is based on the reproduction life requisite.

3. Black-capped chickadee

V1 = Percent tree canopy closure.

HSI: 1.0 if between 50% and 75%.

V2 = Average height of overstory trees.

HSI: 1.0 if $>$ 49.2 ft.

V3 = Number of snags 4-10" dbh per acre.

HSI: 1.0 if $>$ 2.

The Riparian hardwood habitat type (4 sample sites) was evaluated for this model. The HSI determination is based on the lowest of the two values obtained for the food and reproduction life requisites.

4. Downy Woodpecker

V1 = Basal area.

HSI: 1.0 if basal area is between 10 and 20 m/ha.

V2 = Number of snags $>$ 15 cm dbh/0.4 ha ($>$ 6 inches dbh/1.0 acre).

HSI: 1.0 if 5 or more snags $>$ 15 cm dbh/0.4 ha.

The Riparian hardwood habitat type (4 sample sites) was evaluated for this model. The HSI determination is equal to the lowest life requisite value.

Appendix: (cont.)

5. Pond-Breeding Amphibian Model (Draft)

- V1 = Water permanence.
HSI: 1.0 if water is permanent for more than 6 consecutive months.
- V2 = Percent of area with permanent water present.
HSI: 1.0 if between 15 and 40% of area has permanent water present.
- V3 = Water current.
HSI: 1.0 if there is a slow water current.
- V4 = Percent of standing water area covered by water 4 to 40 inches deep December through March.
HSI: 1.0 if 100% of wetland area is covered by water 4 to 40 in deep December through March.
- V5 = Percent of standing water with floating aquatic, emergent, and woody macrophytes.
HSI: 1.0 if $> 50\%$ of the area's wetland vegetation consists of floating aquatics/emergent/woody macrophytes.
- V6 = Percent of ground cover along water's edge.
HSI: 1.0 if $\geq 75\%$ ground cover along the water's edge.
- V7 = Associated Habitats
HSI: 1.0 if the associated habitats within 200 m of the wetland edge is forest/wetland shrub habitat.

Riparian hardwood (1 sample site) and Pond (4 sample sites) habitat types were evaluated with this model. The HSI determination equals the lowest life requisite value for either reproduction or cover. The Pond Breeding Amphibians model is in draft form and is currently under revision.

6. Spotted Sandpiper

- V1 = Nesting cover (a mosaic of herbaceous ground cover with an overall density of less than 50% and less than 2 feet high; over-story of deciduous trees can be present if ground cover requirements are met).
HSI: 1.0 if between 12.5% to 75%.

Appendix: (cont.)

V2 = Nesting distance from water

HSI: 1.0 if \leq 75 feet

V3 = Foraging habitat

HSI: 1.0 if \leq 50% organic ground cover (debris or drift).

The sand/gravel/cobble habitat type (2 sample sites) was evaluated with this model. The HSI determination is based on the foraging, cover, and reproductive life requisites.